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SELECT FOR SUCCESS:

A Toolset for Enhancing Soldier Accessioning



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ARMY STRONG

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2011/2013

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Select for Success: A Toolset for Enhancing Soldier Accessioning

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**U.S. Army Research Institute
for the Behavioral and Social Sciences**

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Foreword

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has been researching non-cognitive measures for use in the Army's accessioning system for nearly a decade. This research coincided with an emerging Army need to more fully optimize the personnel management system, particularly in the area of Soldier acquisition. The initial findings are part of a 6-year longitudinal validation of non-cognitive measures to improve Soldier selection and classification. These measures, including the multi-faceted *Tailored Adaptive Personality Assessment System* (TAPAS), aim to supplement the current screening provided by the Armed Services Vocational Aptitude Battery (ASVAB) and educational credentials. The very promising indications of the early returns in the Army validation led Army leadership to approve the *Tier One Performance Screen Initial Operational Test and Evaluation (TOPS IOT&E)* in 2009.

The TOPS IOT&E was implemented by the Deputy Chief of Staff, Army G-1 in March 2009 with support from the Commanding General, U.S. Army Accessions Command and Deputy Commanding General, Initial Military Training, Training and Doctrine Command. The TOPS Research Program is still in progress. This special report presents a non-technical overview of the development and current status of the program. It is intended to inform and stimulate discussion and response.



MICHELLE SAMS, Ph.D
*Director and Chief Psychologist
of the United States Army*

Acknowledgements

Many people have made the research described in this report possible. This includes teams of researchers, data collection staff, and support personnel at the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) and its contractors: the Human Resources Research Organization (HumRRO) and the Drasgow Consulting Group (DCG). In addition, there are literally thousands of Army enlisted personnel, noncommissioned officers, officers and civilians who have contributed to the successful conduct of this research. ARI is particularly indebted to the senior NCO members of the Army Test Program Advisory Team who have helped to ensure the success of ARI research through their ideas and support.

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What if the Army could:

- ...screen out low motivated, low performing applicants?
- ...screen in highly motivated, high performing applicants?
- ...better predict APFT success?
- ...reduce the number of Soldiers who attrit before commitment completion?
- ...reduce the time and effort units devote to dealing with problem Soldiers?
- ...select Soldiers who are more satisfied with the Army and their MOS?
- ...select Soldiers who are more likely to espouse and reflect Army Values?

"The TOPS research provides the means to improve the Soldier selection process with the flexibility to accommodate changing recruiting demands. Our goal is to continue to attract the most highly qualified patriots for service in our Army. This research will contribute significantly to achieving that goal."

LTG Thomas P. Bostick
Deputy Chief of Staff, G-1

"At the end of the day, it's all about measuring the heart of the Soldier. TAPAS gets us closer to measuring the motivation and spirit of the Soldier."

LTG Benjamin Freakley
CG, US Army Accessions Command

The Whole Person Assessment Approach

All of these “what if’s...,” and more, are possible today based on the results of a promising new area of Soldier research being carried out by the Personnel Assessment Research Unit (PARU) of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), sponsored by the Deputy Chief of Staff, Army G-1 and in collaboration with U.S. Army Accessions Command (USAAC). This new area of Soldier selection is based on the concept of “whole person assessment,” which incorporates measurement of temperament, interests and attitudes – called “*non-cognitive*” factors – into the Soldier initial entry screening and selection process.

Traditionally, Army applicants have been screened on the basis of *cognitive* factors (in addition to educational, physical, medical and moral considerations). Cognitive assessments (basically, what a person knows) are determined by the *Armed Services Vocational Aptitude Battery (ASVAB)*, which is comprised of nine separate subtests. Four subtests of the ASVAB are combined to calculate a Soldier’s *Armed Forces Qualification Test (AFQT)* composite score, to assign a score category (Categories I through IV) and to determine enlistment eligibility. Additionally, ASVAB subtests are used to determine Soldiers’ Area Aptitude scores which determine qualification for a specific MOS.

Armed Forces Qualification Test (AFQT)

The AFQT, which combines certain subtests of the ASVAB, is used to determine enlistment eligibility and other enlistment considerations. Applicants are assigned to one of six categories based on their AFQT Scores.

Category	Percentile
I	93-99
II	65-92
IIIA	50-64
IIIB	31-49
IV	10-30
V	1-9

Applicants scoring in Categories I-IIIA are given priority for accession over those scoring below the mean. Applicants below the mean are assigned to Category IIIB (slightly below average) and Category IV (lowest acceptable category). Category V applicants are not eligible to enlist.

level Soldiers will be in Basic Combat Training and in completing the technical qualification training for their MOS. Further, evidence shows that Soldiers with higher AFQT and ASVAB scores perform better on skill proficiency once they have been assigned to their units.

As Army NCOs have been saying for years, the ASVAB focuses on “brain smarts,” but a lot of what accounts for success in the Army comes from what is “inside” the Soldier

– a truly successful Soldier works hard, shows leadership potential, supports peers and the Army team, keeps going when the challenges are tough, stays out of trouble, works to develop skills and is committed to the Army by successfully completing at least his/her initial enlistment term. These are outcomes that the ASVAB was never designed to predict – we call these the “*will-do*” aspects of being a Soldier, as compared to the “*can-do*” performance that is quite successfully predicted by the ASVAB (see Table 1).

Relationship Between Performance Predictors and Performance

Performance Criterion	Pre-Enlistment Performance Predictors	
	Cognitive : “Can-do” (ASVAB/AFQT)	Non-Cognitive: “Will-do” (TAPAS)
Training Grades	✓✓	✓
IMT Graduation	✓	✓✓
Job Knowledge	✓✓	✓
Physical Fitness / APFT		✓✓
Job Effort	✓✓	✓
Peer Support	✓	✓
Peer Leadership	✓	✓
Indiscipline		✓
Commitment to the Army		✓
Attrition		✓

Table 1.
Cognitive assessment is designed to predict Soldier “can-do” performance, but it also contributes to the prediction of some “will-do” outcomes. Likewise, non-cognitive predictors predict “will-do” outcomes, but can enhance cognitive assessments with the prediction of “can-do” outcomes.

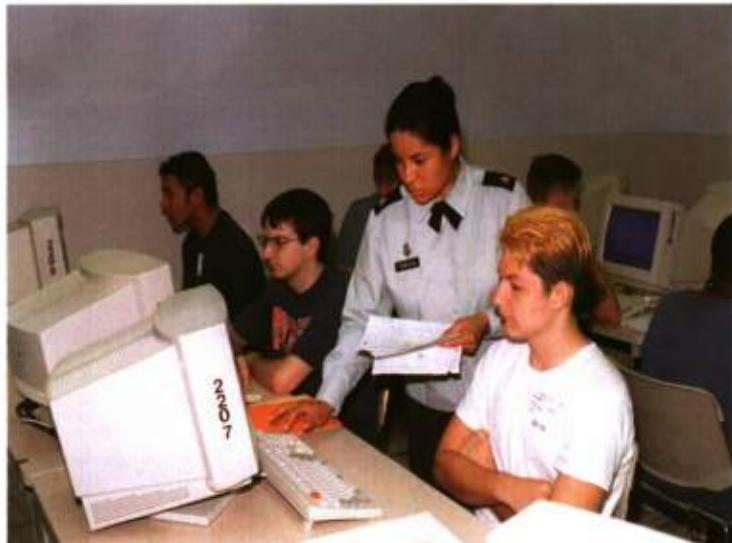
Note: One check indicates a small to medium effect. Two checks indicates a medium to large effect.

Source: Knapp, D.J., & Heffner, T.S. (Eds.) (2010). *Expanded Enlistment Eligibility Metrics (EEEM): Recommendations on a non-cognitive screen for new Soldier selection* (Technical Report 1267).

Selecting Soldiers on the basis of cognitive factors focuses on important dimensions (such as math skills or mechanical abilities), but is only looking at part of an individual’s make-up. What is needed, both for the individual and the Army, is an assessment of the whole person – to give insights as to how a person will function in the

Soldier environment. The Army knows what kinds of Soldiers it wants – the challenge always has been to find a way to reliably predict beforehand who these desirable persons are (and to screen out those with undesirable characteristics). Personnel research over the past decade has provided what the Army is looking for – we are on the cusp of providing a new measurement toolset to more fully identify, prior to enlistment, the individuals who will be successful in the Army.

The toolset reflects a new approach to Army applicant assessment; one that combines the tried and proven standards of ASVAB/AFQT, educational, moral and physical screens, with prototype assessments that evaluate behavior indicators and qualities that make up the whole person. Moreover, it requires expanding the performance domain criteria – how we judge the effectiveness of any measure – beyond the initial military training (IMT) and retention focus currently used, to criteria that include Soldier performance and behaviors during their initial unit of assignment and beyond. The whole person assessment requires obtaining a more complete picture of extended Soldier performance on which to base assessment decisions.



This new approach is called a “toolset” because it is not a single test or measure, but rather is made up of multi-faceted measures and combinations in response to specific requirements – the right tool must be matched to the need. And, most significantly, nothing goes into the toolset until it has been validated as doing what it is supposed to do.

Many promising candidate measures are being explored to expand the toolset beyond the ASVAB. The *Assessment of*

Individual Motivation (AIM) predicts motivational and adaptability components of performance and is being used in Army selection applications including screening non-high school diploma graduates. The *Work Preferences Assessment (WPA)* is a measure that examines the correspondence between what a person is looking for in a job or what the person values about work (e.g., clear rules and regulations, working alone, helping others) and what the Army offers. Changes are being investigated in the cognitive arena as well, as DoD is trying out several potential new ASVAB subtests including the *Information and Communication Technology Literacy (ICTL)* test. But the main component that has emerged to join the ASVAB in the entry-level selection and classification toolset is the *Tailored Adaptive Personality Assessment System (TAPAS)*.

Building the Toolset: The Tailored Adaptive Personality Assessment System (TAPAS)

To assess the non-cognitive temperament and motivational characteristics, or “will-do” attributes of applicants, ARI developed the TAPAS (see Table 2). The TAPAS is specifically designed to identify and measure those dimensions that are essential for Soldier performance but are not fully captured by the ASVAB.

The TAPAS is a different type of “test” because there are no right or wrong answers. It uses straight-forward statements and a set of “forced choice” responses. It is computer-based and adaptive in the sense that each response determines which two statements will be paired together next. Essentially, no two persons take exactly the same “test.” The TAPAS is now being administered at the Military Entrance Processing Stations (MEPS) along with the ASVAB.

There are two elements of the TAPAS that make it distinctive and particularly suitable

for use in the Army. First, it is designed as a selection and screening tool. A majority of temperament measures are not designed solely for selection purposes. As an instrument designed to enhance Soldier selection, the TAPAS must undergo widespread trials to establish its validity for this function.

How Does TAPAS Differ From the Global Assessment Tool (GAT)?

Both TAPAS and GAT are non-cognitive appraisals of temperament and attitudes. However, they are otherwise very dissimilar. A component of the Comprehensive Soldier Fitness program, GAT is a self-administered, self-evaluated mental health diagnostic, intended to identify changes over time in resilience and coping skills. TAPAS is a personnel selection tool designed to enhance and expand existing selection measures by providing an assessment of the whole person.

The second critical characteristic is that the TAPAS is proving to be highly resistant to deliberate response distortion or “faking” on the part of the individual. Persons taking a temperament assessment (which can include such attributes as achievement and tolerance) usually have a self-interest in responding positively regardless

of how they really feel. The TAPAS, through paired forced choices and computer adaptation based on responses, appears to largely overcome this drawback.

Sample TAPAS Item

Which of these statements is most like you?

- A. I seldom lose sleep over worries
- B. I have enjoyed being in positions of leadership

Note: Forced choice measures provide no obvious best/worst answer

In application, TAPAS works much like the ASVAB in that it is made up of a number of independent subtests or *facets*. These can then be combined in a number of different ways, depending on the goal of the assessment. Similarly, the AFQT and General Technical (GT) scores are calculated based on a composite of subtests.

Table 2.

Temperament Dimensions
Measured by
TAPAS

Characteristic	Description
Achievement	Measures an individual's level of ambition, confidence, resourcefulness and industry.
Cooperation	Measures agreeableness, trust, skepticism and suspicion; the extent an individual is easy or difficult to get along with.
Dominance	Measures assertiveness or submissiveness and propensity to "take charge."
Even Tempered	Measures disposition to anger, hostility, calmness and stability.
Attention Seeking	Measures an individual's tendency towards shyness or need for social attention; captures boastfulness or diffidence.
Selflessness	Measures selflessness and selfishness; an individual's tendency to be giving, charitable, egotistical or greedy.
Intellectual Efficiency	Measures a person's ability to analyze and process information, astuteness or obtuseness.
Non-Delinquency	Measures a person's tendency to be lawful and to comply with authority including propensity to follow rules and regulations.
Adjustment	Measures a person's reaction to new situations including levels of nervousness, apprehension, anxiety and certainty.
Physical Conditioning	Measures proclivity for participating in sports, physical activity and outdoor activities as well as sedentary tendencies.
Self-Control	Measures patience, deliberateness, caution, impulsiveness and rashness.
Sociability	Measures a person's level of interest in social interaction including gregariousness, talkativeness and introversion.
Tolerance	Measures a person's acceptance of differing customs, viewpoints, persons, and events or bias and lenience towards persons and situations.
Optimism	Measures cheerfulness and emotional outlook; captures positivism, negativism, depression and contentment.

Does TAPAS Work?

The Validation and the Evidence

To find out which of the various instruments and combinations of non-cognitive assessments were effective, ARI administered possible “best bet” measures to 10,800 new Soldiers going through Army Reception Battalions in 2007 and 2008. ARI has tracked these same Soldiers, collecting outcome data over 3 years. The outcome data include IMT performance (in Advanced Individual Training/One Station Unit Training) and two, time-separated measures of in-unit performance indicators, including supervisor evaluations. The second round of in-unit outcome data analysis will be completed in 2011. ARI also has collected data on the Soldiers’ attitudes, including their adjustment and commitment to the Army and their perceptions of their fit in the Army and their MOS.

While the results are too detailed to fully recount here (a bibliography is provided at the end of this report), overall the TAPAS predicted the spectrum of performance, attitudinal and attrition outcomes. In short, Soldiers who scored “passing” on TAPAS screens were shown to be “successful”

Tier Two Attrition Screen (TTAS)

An ARI forerunner to the current TAPAS-centered selection screen is the TTAS. Even though non-high school diploma graduates (NHSDG) must pass the same AFQT standards as HSDGs, DoD has placed a 10% cap on Tier Two (NHSDG) accessions due to their higher attrition rate. In 2004, ARI developed a screen which combines a temperament measure (the Assessment of Individual Motivation [AIM]), the ASVAB, and body mass index (BMI) for a “whole person” pre-enlistment assessment. The TTAS predicts attrition – Soldiers passing the screen attrit at a rate approximately 10 percentage points less than those who fail the TTAS. Since its implementation in April 2005, an additional 25,000 highly qualified Soldiers have been accessed who would not otherwise have been identified.





in APFT scores, job effort, indiscipline rates and attrition regardless of their AFQT category. Several specific examples illustrate this effectiveness.

Figure 1 shows the value of adding TAPAS to increase prediction of performance above and beyond the AFQT. TAPAS increases the Army's ability to predict training exam grades by a small margin, but the big pay-off is in the outcomes that reflect motivational differences – graduating from training, staying in the Army at least 6 months, avoiding disciplinary incidents, scoring higher on the APFT and self-reports of adjustment to Army life. In all cases, adding the TAPAS to the AFQT provides significant improvement to the predictiveness of the AFQT, compared with the power of the AFQT if used alone.

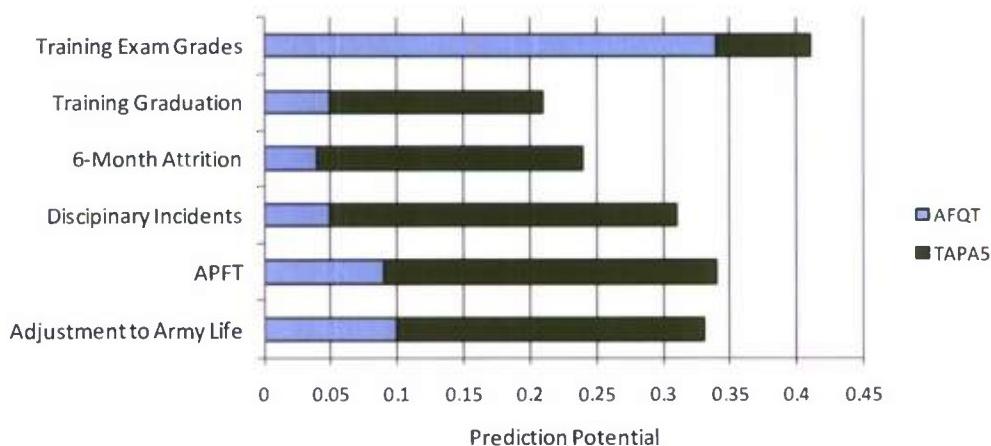


Figure 1.
TAPAS added
to AFQT
prediction of
multiple
performance
outcomes.

Note: The blue portion of the line shows the relationship between the AFQT and the performance indicator. The green portion of the line shows how much the addition of the TAPAS improves prediction beyond using AFQT alone. Data collected Oct 07-May 08.

Two other results indicate the value of the TAPAS by showing how it can identify AFQT Category IIIB Soldiers who perform as well or better than Category I-IIIA Soldiers on outcomes important to the Army. Figure 2 shows that Soldiers in IMT who “pass” (represented by the “star”) the TAPAS have fewer disciplinary incidents than Soldiers in any of the other AFQT categories and significantly fewer disciplinary problems than Soldiers who “fail” the screen. Likewise, for 6-month attrition (see Figure 3), Soldiers “passing” the screen attrit at significantly lower rates than Soldiers in all other AFQT categories.

Figure 2:
Disciplinary incidents by AFQT category and TAPAS pass/fail status. Data collected Oct 07–May 08.

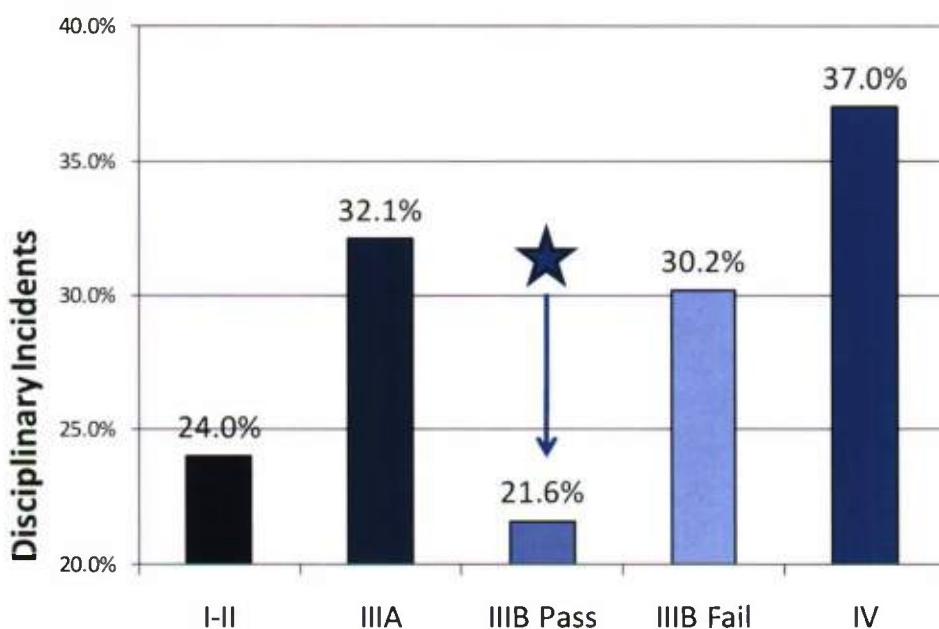
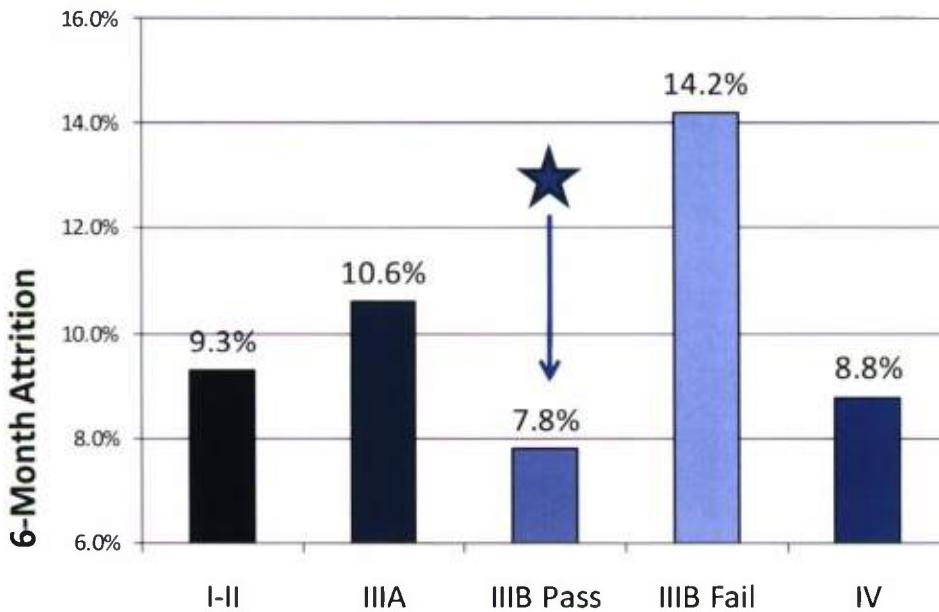


Figure 3: Six-month attrition percentages by AFQT category and TAPAS pass/fail status. Data collected Oct 07–May 08.



The validation also looked closely for indications of bias and found that gender, race, or ethnicity did not impact the relationships. In fact, unlike most cognitive tests, the non-cognitive TAPAS scores are slightly higher for females, African-Americans, and Hispanics than for males and Caucasians. Even before the final inputs of this 6-year validation effort are completed, the following conclusions have been well-supported:

TAPAS scores can identify both high and low motivated Soldiers

For all AFQT categories, highly motivated Soldiers identified by TAPAS have higher “will-do” outcomes (e.g., higher APFT scores and leadership ratings, lower attrition and disciplinary incidents)

For all AFQT categories, highly motivated Soldiers identified by TAPAS have better “can-do” outcomes (e.g., training scores, performance ratings)

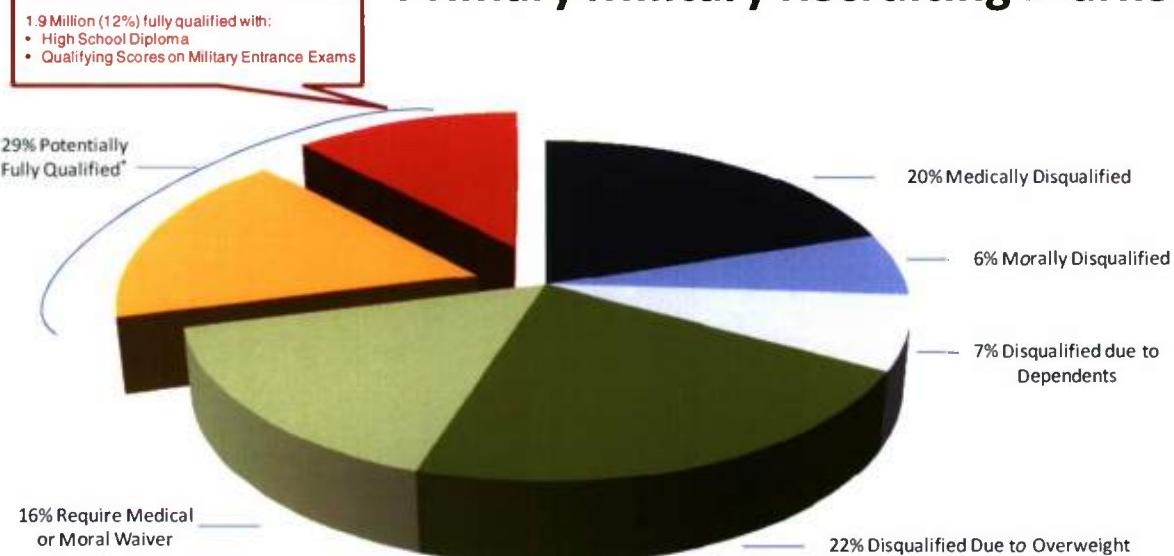
Based on the strength of these research results, the Army is conducting an initial operational test and evaluation (IOT&E) of the Tier One Performance Screen (TOPS). TOPS is intended to examine the “best bet” non-cognitive assessments as supplements to the ASVAB starting with TAPAS. One aspect of the IOT&E is the “screening out” of applicants in AFQT Category IV, the lowest accepted category, who score particularly low on the TAPAS. For applicants who take the TAPAS in the MEPS and enlist in the Army, data collection will continue both on IMT and in-unit performance, with final analysis and conclusions due by the end of 2013. However, preliminary analysis results based on IMT performance will be available in early 2011.

How TAPAS Enables the Personnel System: Supporting Flexibility, Adaptability and Agility

The Army personnel management system of the 21st Century faces many new challenges. The need is for an agile personnel system that more fully assesses individual potential for both initial selection and job classification. The system requires flexibility to accommodate fluctuations in force size, structure, mission demands, budget and the availability of qualified applicants. The accession goal is not just quantity of personnel, but improved performance, better person-job match and increased retention. To meet these rapidly shifting challenges, the Army needs adaptable and flexible, but still highly effective, selection and assignment tools.

TAPAS and other non-cognitive measures currently being researched provide a toolset to help address the personnel challenges. Less than 30% of the youth population is *potentially* fully qualified, with 12% being fully qualified for military service. So the chal-

Primary Military Recruiting Market



- Of the 15.4 million U.S. male population **(17-24 years old), 6.9 million (45%) are potentially fully qualified or require a waiver
- Only 29% are potentially fully qualified

*Potentially fully qualified means that they have the potential to obtain a High School Diploma
**This population does not include the incarcerated or those already in the military.

Source: Center for Accessions Research, U.S. Army Accessions Command

lenge is to identify those individuals who are qualified, will have high performance and will honor their commitment to Army service. When ARI first started gathering data on the validity of TAPAS, there was enthusiasm within the Army leadership about using TAPAS as a market expander that would permit the Army to “screen-in” high potential applicants. The “screen-in” process refers to the Army’s ability to identify applicants with TAPAS scores that indicate that they have the motivation and potential to perform at a higher level than suggested by their AFQT scores. Basically, the TAPAS allows the Army to better identify high performing Soldiers that, based on their AFQT scores, would not have been predicted to perform well.

“TAPAS provides us a unique tool. In today's operational environment, leaders are more aware than ever that Soldier development requires assessment of different attributes.”

- CSM Brian Hamm
198th Infantry Training Brigade

During the short course of this research, there was an abrupt expansion in the applicant population due to the economy. Suddenly, the number of applicants exceeded the number of Soldiers needed. Instead of “screening in” high potential candidates, the emphasis turned to “screening out” applicants with the lowest potential for success. The inherent flexibility in a personnel system that capitalizes on multiple accession screens, including the TAPAS, allows for quick adaptation in the accession decision criteria to meet new mission requirements.

Having an accessioning system that quickly adjusts to the ever-changing market conditions associated with Army recruiting is a must. With a single screen such as the AFQT, it is difficult to achieve that goal. The addition of new measures, in this case the TAPAS, which addresses other aspects of the individual, gives the Army more flexibility to achieve the proper balance between accession quantity and the level of potential among those assessed.

Making Selection Tools Work – A Multipart Developmental Requirement

Unlike cognitive tests which give a definitive individual “score” (such as reading or math skills), non-cognitive measures such as TAPAS require well-planned, targeted, and sometimes complex scoring algorithms. First, the outcome has to be identified - while outcomes such as attrition are defined, other outcomes such as “job performance” and “leadership” are more complex. Then the non-cognitive measures must be tailored to how they will be used – just because there are 15 dimensions in the TAPAS doesn’t mean that all are used. Also, non-cognitive assessments such as TAPAS are not “stand-alones;” they work best when combined with measures such as ASVAB, life-experience information and even physical abilities. Finding the right mix of measures which enhance the total outcome is essential. Finally, measures such as ASVAB and TAPAS are screens – that means that “cut scores” must be empirically established at certain levels. These “cut scores” are used to determine the effect the measure will have. In accession screens, both the quantity of personnel needed and performance potential factors must be considered to determine the appropriate cut score. This requires a significant validation effort and large operational data collections to provide Army leadership with the knowledge needed to make implementation decisions.

Other Applications

Questions naturally arise as to whether non-cognitive applications can be applied to other Army populations as well – specifically to the selection of Army officers and to in-service personnel. The answer to both is “yes.” While the focus of TOPS and TAPAS is enlisted accessions, other applications are being researched.

- Developing non-cognitive measures for selecting recipients of ROTC scholarships and selecting candidates for Officer Candidate School (OCS).
- Exploring the use of non-cognitive tests to enhance in-service selection decisions. For example, identifying Soldiers better suited for assignments as Recruiters, Instructors and Special Forces.

Summary: The Way Ahead

Although there have been periodic refinements in its application, the Army’s sole aptitude selection screen for accessions is the AFQT, a subtest composite of the ASVAB, which became operationalized as the single DoD selection and classification battery in 1976. While this approach has served well, and should continue to play the critical central role in the Army accessioning program, new research has opened up exciting new capabilities to improve the Army’s system of personnel accession management. ARI’s non-cognitive measures, such as TAPAS, validated and constructed to function in an operational environment, offers a means to more fully assess an individual’s Army potential as part of a whole person assessment approach. Implementation will contribute to:



- Screening out low motivated applicants
- Screening in highly motivated applicants
- Better predicting APFT success
- Reducing the numbers of Soldiers attriting
- Reducing the time and effort devoted to dealing with problem Soldiers
- Selecting Soldiers who are more satisfied with their MOS
- Selecting Soldiers who are more likely to espouse and reflect Army Values

Suggested Additional Reading

If you would like to read more detail on non-cognitive measures, the TAPAS/TOPS development and validation, or other related ARI work in the use of non-cognitive applications, we offer the following publications list. Most of these are available on-line. If you have problems obtaining any publication, please see the following ARI Contacts section.

Knapp, D.J., & Heffner, T.S. (Eds.) (2009). *Predicting Future Force Performance (Army Class): End of Training Longitudinal Validation* (Technical Report 1257). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Knapp, D.J., & Heffner, T.S. (Eds.) (2010). *Expanded Enlistment Eligibility Metrics (EEEM): Recommendations on a non-cognitive screen for new Soldier selection* (Technical Report 1267). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Knapp, D.J., & Tremble, T.R. (Eds.) (2007). *Concurrent validation of experimental Army enlisted personnel selection and classification measures* (Technical Report 1205). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Russell, T. L., & Tremble, T. R. (2011). *Development and Validation of Measures for Selecting soldiers for the Officer Candidate School* (Technical Report in Publication). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

ARI Contacts

If you have any questions, comments or suggestions for the research discussed in this Special Report, we welcome them. Please feel free to contact us.

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